Patent Application No. 10/697,358
Amdt. Dated February 28, 2007
Reply to Office Action of November 28, 2006

Docket No. SAM2.PAU.32

REMARKS

History of Prosecution

The above caption application was initially filed with a total of forty claims including independent claims 1 and 21. Claims 1-20 are drawn to a method associated with the invention, while claims 21-40 are drawn to an apparatus associated with the invention.

In the outstanding Office Action, claims 3, 15, 16, 18, 20, 23, 35, 36, 38 and 40 are objected to as being dependent upon s rejected base claims. The Office Action indicates that these claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The remaining claims 1, 2, 4-14, 17, 19, 21, 22, 24-34, 37 and 39 have been rejected on the cited art.

In accordance with this amendment, claims 2 and 22 have been cancelled. The recitations in these claims have been added to claims 1 and 21, respectively. In addition, claims 15, 18, 20, 35, 38, and 40 have been placed in independent form. As presently submitted, the application includes claims 1, 3-20, 21 and 23-40. Included within these claims are independent claims 1, 15, 18, 20, 21, 35, 38, and 40.

Patent Application No. 10/697,358
Amdt. Dated February 28, 2007
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Docket No. SAM2.PAU.32

Objections to the specification

The specification has been objected to at page 26 line 21. At this location, it is

suggested that the acronym ASIC be changed to Application-Specific Integrated Circuit

(ASIC). This suggested change has been incorporated into the specification.

Claim rejections under 35 USC section 102 citing Ozawa et al.

Independent claims 1 and 21 are included in this rejection. Claim 1 has been

amended to recite the step of "calculating a different weighting coefficient for the output

of each filter." This clearly distinguishes the Ozawa et al reference which teaches use of

a coefficient calculation circuit 8 which provides a coefficient signal 9 representing the

coefficient equal to a ratio of a level of the low-frequency component signal 7 to that of

the low-frequency component signal 6. (Column 4 lines 54-59). This coefficient signal 9

is applied to the pre-filtered output from the 1H delay circuit 2 in a multiplier 10. The

different weighting coefficients recited by Applicant are applied to the output values of

the first and second filters to generate the interpellation output value for the selected

image position. Ozawa et al teaches away from any method or combination which would

apply different weighting coefficients to the outputs of two filters to achieve an

interpellation output value. Based on this recitation alone, Claim 1 distinguishes the

teachings of Ozawa et al.

Claim rejections under 35 USC section 103 citing Ozawa et al. in view of Chui

Claim 1 and claim 21 as amended are also distinguished by their recitations of a

calculating step or calculator that includes the step of estimating the image high

Patent Application No. 10/697,358
Amdt. Dated February 28, 2007
Reply to Office Action of November 28, 2006

Docket No. SAM2.PAU.32

frequency level at the selected image positions and calculating the weighting coefficients

based on the estimated image high frequency level. These recitations were originally

found in claim 2 and claim 22, which are now cancelled.

The Office Action acknowledges that Ozawa et al fails to disclose estimating the

image high frequency level at the selected image position, and calculating a weighting

coefficient for the output of the filter based on the estimated image high frequency level.

For this disclosure, the Office Action relies on Chui suggesting that Chui teaches

estimating the image high frequency level at the selected image position. More

specifically, the Office Action refers to the "sharpening data 304" discussed in column 11

lines 13-17. But this passage merely indicates that the initial image data can be filtered

by one or two high pass filters 244, 246 to generate the sharpening data 304.

It is this data 304 which is weighted by a sharpening parameter S or two

sharpening parameters S and T. In this case, Chui teaches that the coefficients of the high

pass filters 244, 246 can be scaled by their respective sharpness parameters S and T,

which may be selected by the user or by an application using the sharpening parameter

selector 163. The weighted sharpening data is then combined with the initial magnified

image data 302 using an image data summer or adder 262. (Column 11 lines 17-24).

Note in particular that Chui fails to disclose or even contemplate the step of

estimating the image high frequency level at the selected image position. Use of this

estimated data as weighting coefficients for the first and second filters, as taught by

Applicant, is clearly beyond the disclosure of Chui. While Applicant teaches the

weighting of outputs from two low pass filters, Chui contemplates two high pass filters

which generate sharpening data that is then weighted by sharpening parameters S and T.

Finally, the Office Action suggests that it would be obvious to one of ordinary

skill in the art at the time of the invention to modify Ozawa et al by incorporating the

teachings of Chui. Applicant strongly disagree with this conclusion noting that there is

no teaching in the prior art which would suggest this combination. There is no teaching

as to how such a combination would be connected, let alone how the connection would

achieve the results desired by either patentee. More specifically, note that Ozawa et al

teaches the derivation of two coefficients from the outputs of two filters, the coefficients

then being applied to pre-filter data. If the weighted sharpening data of Chui were

applied to Ozawa, one would expect it to also be applied to the pre-filtered data. This

would not accomplish the results desired by either Ozawa et al or Chui.

**Claim rejections under 35 USC section 103 citing Ozawa et al. in view of Chui and
further in view of Curry et al.**

Claims 4 and 24 are included in this rejection. The failure of Ozawa et al and

Chui to provide a valid combination of references let alone a reference that meets the

recitations of Applicants, has already been discussed. The Office Action now notes that

Ozawa et al as modified by Chui fails to disclose the interpolation output value q for the

selected image position as recited in method claim 4 and apparatus claim 24. For this

disclosure, the Office Action relies upon Curry et al citing equation 23 in paragraph

[0116]. Although Applicants recited formula is similar to formula 23 of Curry et al, the quantity α in each case is totally different. Note that α in the Curry patent is disclosed to be a blending fraction value as expressed by the remaining five least significant bits of BNK. But BNK is an output from the Pixel Control module B7, not the filter output values as taught by Applicants.

Finally it is suggested that it would be obvious to one of ordinary skill in the art at the time the invention was made to further modify Ozawa et al's system as modified by Chui by including the method step and linear interpolation unit as contemplated by Curry et al. As previously noted, the combination of Ozawa et al and Chui is believed to be invalid. Adding Curry to this combination would appear to be impossible. Note in particular that there is no indication how the various systems could even be connected to accomplish a result desired by any of these patentees. To use Curry's formula to apply weighting coefficients to sharpening data as taught by Chui and further to apply that result to pre-filtered data as contemplated by Ozawa et al would accomplish no purpose whatsoever particularly the purpose contemplated by Applicants.

Claim Rejections under 35 USC section 103 citing Ozawa et al. in view of Wu et al.

Claims 5-11 and 25-31 are included in this rejection. The following remarks are applicable to both the method claims 5-11 as well as the apparatus claims 25-31. It is specifically noted that Ozawa et al fail to disclose that the first filter and second filter both comprise a one dimensional FIR polyphase filter. Wu et al is relied on for this disclosure. More specifically, the Office Action refers to the teachings of Wu et al at

Patent Application No. 10/697,358
Amdt. Dated February 28, 2007
Reply to Office Action of November 28, 2006

Docket No. SAM2.PAU.32

column 5 lines 26-54. In this passage, Wu et al contemplate use of four filters to process

an input signal. However, the input signal contemplated is not a signal relating to image

positions in an original image and does not produce an interpolated output image.

Rather, Wu et al apply the four filters to a pixel luminance value Y (n) according to an

associated filter kernel. Thus, Wu et al teaches away from the method and apparatus

recited by Applicant in claim 5. There is no teaching that the current Pixel luminance

value could be used in a method of interpolating image positions to produce an

interpolated output image. There is no teaching as to how the filters illustrated in Figure

2 of Wu et al would be connected into Figure 1 of Ozawa et al to accomplish a result

desired by either patentee. The fact that a filter array including four FIR filters might be

useful in the circuit of Wu et al, does not suggest or render obvious that the same array of

filters could be used in the circuit of Ozawa et al which requires only two filters. The use

of a four filter array teaches away from the concept of Ozawa et al and fails even further

to meet the recitations or disclosure of Applicants.

It will also be noted that there are other recitations in claim 5 which distinguish

the combination of Ozawa et al and Wu et al. Notably, the reference combination fails to

calculate different weighting coefficients by estimating the image high frequency level at

selected image positions and calculating the weighting coefficients for the filters based on

the estimated image high frequency level, as recited by Applicants. This recitation has

already been applied to distinguish from the cited art and particularly the patent of Chui.

Method claims 6-11 and apparatus claims 26-31 also contain recitations which further

distinguish the questionable combination of Ozawa et al and Wu et al.

Claim rejections under 35 USC section 103 citing Ozawa et al. in view of Wu et al. and further in view of Chui

Claims 12, 13, 17, 19, 32, 33, 37 and 39 are included in this rejection. It has already been shown that the combination of Ozawa et al and Wu et al would not be viable. The addition of Chui does not cure the lack of support for the combination. As previously noted with reference to claim 1, Chui is relied on for the proposition of estimating the image high frequency level and calculating weighting coefficients based on that estimate. The distinguishing comments are fundamental to any combination of Ozawa et al and Chui and apply equally well to the further recitations in these dependent claims.

Claim rejections under 35 USC section 103 citing Ozawa et al. in view of Wu et al. and Chui, and further in view of Weldy

Claims 14 and 34 are included in this rejection. The comments set forth above distinguishing Ozawa et al as modified by Wu et al with reference to claim 5, and further in view of Chui with reference to claim 12, have already been noted. It is now noted that this combination fails to disclose that the image high frequency component at the original image pixels is measured using a high-pass FIR filter. Weldy is relied on for this disclosure. More specifically, the Office Action refers to column 3 lines 59-67 and column 4 lines 1-4 of Weldy. In this passage, Weldy suggests that each of the transformed red, green and blue channels can be filtered by applying a finite impulse response (FIR) filter to a digital image. But such a filter has already been distinguished

Patent Application No. 10/697,358
Amdt. Dated February 28, 2007
Reply to Office Action of November 28, 2006

Docket No. SAM2.PAU.32

in comments directed to Claims 5 and 25 where Wu et al was relied on for teachings relating to an FIR polyphase filter having N taps and M filter length. As previously noted in those comments, the fact that an FIR filter may offer advantages in one circuit, such as that of Wu et al or Weldy, does not render it obvious that such a filter could be applied in all situations. It is Applicant who has shown this result to be advantageous in his specific system wherein different weighting coefficients are calculated by estimating the image high frequency level as disclosed and claimed by Applicants.

Combination of references

As previously noted, in any combination of references, the motivation to combine must be found in the prior art. In this Office Action, no fewer then five references have been cited in various combinations to meet the claim recitations of Applicants. Yet there is no showing in any of these references, or any other prior art for that matter, as to how the various components might be combined to accomplish any desirable purpose, let alone the advantages taught by Applicants. By way of example, take the combination of Ozawa et al in view of Wu et al and further in view of Chui. Chui was the last patent to issue and yet his disclosure makes no mention or suggestion that he might produce an advantageous combination with Ozawa et al or Wu et al. And these are not persons having mere ordinary skill in the art. Rather, they are persons of superior skill in the art as noted by the fact that patents have issued to them. While the combination of two patents might be found obvious in a particular situation, the probability of obviousness involving as many as four patents is highly suspect.

Allowable subject matter

As initially noted, several claims have been objected to as being dependent upon

rejected based claims. The Office Action indicates that these claims would be allowable

if rewritten in independent form including all of the limitations of the associated base

claim and any intervening claims. Accordingly, vlaims 15, 18, 20, 35, 38 and 40 have

been rewritten in independent form. Claims 3 and 23, although indicated to be merely

objectionable, have been left in dependent form, but have been made dependent on

amended claim 1. Based on the arguments previously presented, these claims, and the

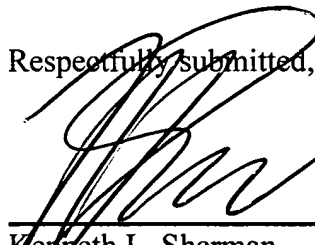claims dependent thereon, should also be allowable.

CONCLUSION

In view of the foregoing remarks, Applicants respectfully request that the

rejections of the claims be withdrawn, and that the case be passed to issue. If the

Examiner feels that a telephone interview would be helpful to the further prosecution of

this case, Applicants respectfully request that the undersigned attorney be contacted at the

listed telephone number.

Please direct all correspondence to **Myers, Dawes Andras & Sherman, LLP**,

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CERTIFICATE OF MAILING

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